

### 3.3.8.2 Bog Relict

#### 3.3.8.2.1 Community Overview

'*Bog relict*' is a term that has been used to describe tamarack-dominated forests and associated patches of "northern" shrubs, mosses, and other acid peatland herbs in the southernmost regions of Wisconsin, including some that are close to the Illinois border. Many of these sites are nearing the extreme southern range limits for many of the species they support and are also quite isolated from one another. They support many nutrient-demanding species, but may include a limited subset of the more northern peatland associates (e.g., *Sphagnum* mosses, ericaceous shrubs, and "bog" sedges). The tamarack canopy is often quite open and discontinuous, due to windthrow, beaver activity, or for other reasons. Poison sumac is often present, and is sometimes the most abundant tall shrub. Speckled alder, nannyberry, willows, and dogwoods are often common associates. See *southern tamarack swamp* for additional details on plant composition.

These sites are typically small, in kettle depressions on outwash or sometimes ground moraine landforms. Many of these stands are fed by groundwater seepage. The surface may include areas of relatively firm peat, but watery muck is often present as well.

Conceptually, *bog relict* is broader and more encompassing than *southern tamarack swamp*, as it includes the full mosaic of northern peatland vegetation (forest, shrub, and herb) occurring within a given kettle wetland. In addition, the term has generally been applied to small discrete and disjunct sites, located far to the south of the typical range of the acid peatland communities.

#### 3.3.8.2.2 Vertebrate Species of Greatest Conservation Need Associated with Bog Relict

Eleven vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with bog relict (Table 3-173).

**Table 3-173. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with bog relict communities.**

<i>Species Significantly Associated with Bog Relict</i>
<b>Herptiles</b>
Four-toed Salamander
Northern Ribbon Snake
<i>Species Moderately Associated with Bog Relict</i>
<b>Birds</b>
American Woodcock
Whip-poor-will
Willow Flycatcher
Blue-winged Warbler
Rusty Blackbird
<b>Mammals</b>
Northern Long-eared Bat
Silver-haired Bat
Eastern Red Bat
Hoary Bat


In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-173 were subject to further analysis. The additional analysis identified the best opportunities, by Ecological Landscape, for protection, restoration, and/or management of both bog relict and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:


- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of bog relict in each of the Ecological Landscapes (Tables 3-174 and 3-175).
- Using the analysis described above, a species was further selected if it had both a significant association with bog relict and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of bog relict. These species are shown in Figure 3-42.


**Table 3-174. Vertebrate Species of Greatest Conservation Need that are (or historically were) significantly associated with bog relict communities and their association with Ecological Landscapes that support bog relict.**

Bog Relict	Herptiles (2)*	
	Four-toed Salamander	Northern Ribbon Snake
Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type		
<b>MAJOR</b>		
Southeast Glacial Plains		
<b>IMPORTANT</b>		
Central Sand Hills		
Southern Lake Michigan Coastal		
<b>PRESENT (MINOR)</b>		
Central Lake Michigan Coastal		
Western Coulee and Ridges		

**Color Key**

 = HIGH probability the species occurs in this Ecological Landscape

 = MODERATE probability the species occurs in this Ecological Landscape


 = LOW or NO probability the species occurs in this Ecological Landscape


\* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.


**Table 3-175. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with bog relict communities and their association with Ecological Landscapes that support bog relict.**

Bog Relict	Birds (5)*					Mammals (4)			
	American Woodcock	Whip-poor-will	Willow Flycatcher	Blue-winged Warbler	Rusty Blackbird	Northern Long-eared Bat	Silver-haired Bat	Eastern Red Bat	Hoary Bat
<b>MAJOR</b>									
Southeast Glacial Plains									
<b>IMPORTANT</b>									
Central Sand Hills									
Southern Lake Michigan Coastal									
<b>PRESENT (MINOR)</b>									
Central Lake Michigan Coastal									
Western Coulee and Ridges									

**Color Key**

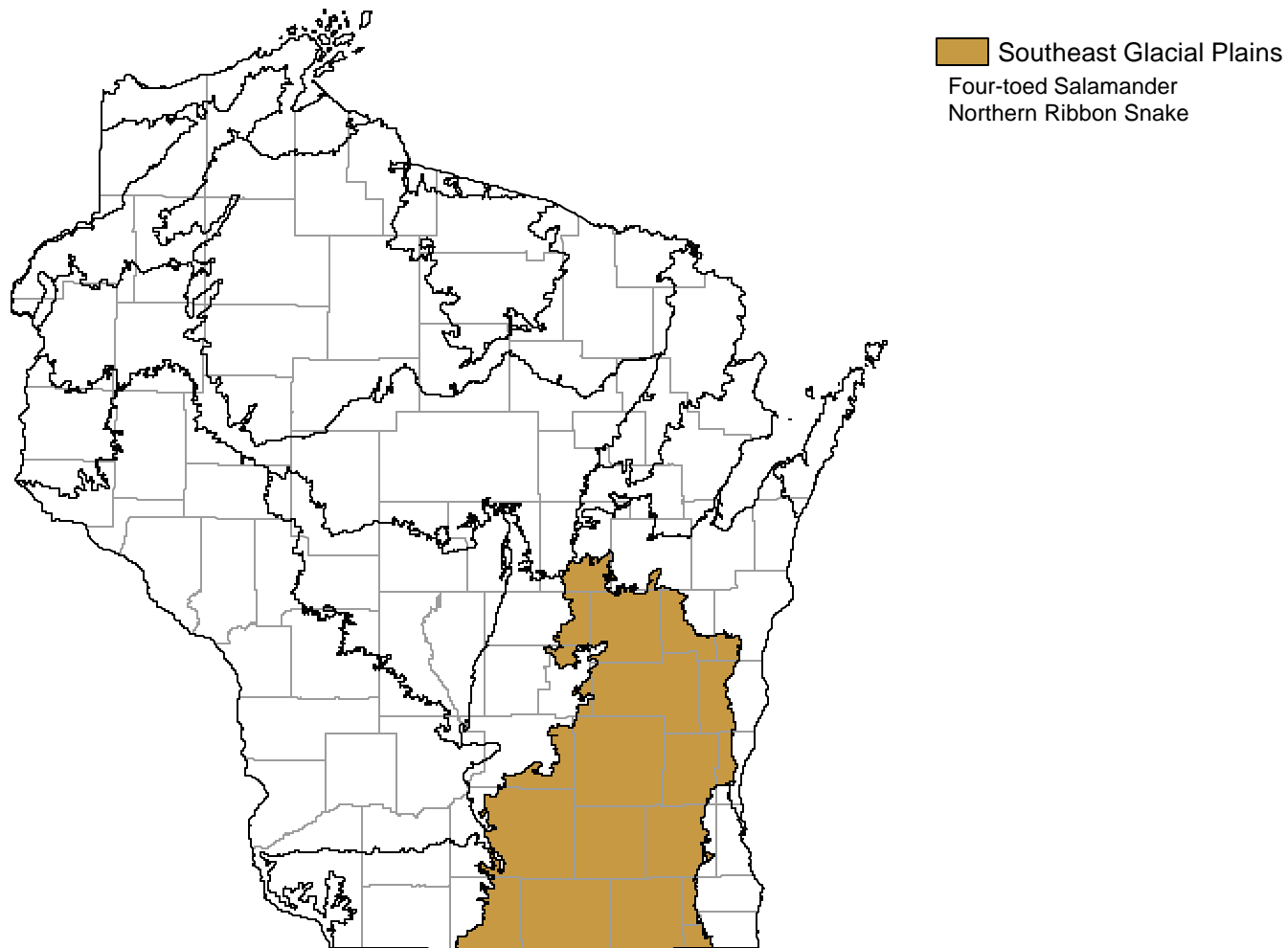
 = HIGH probability the species occurs in this Ecological Landscape

 = MODERATE probability the species occurs in this Ecological Landscape

 = LOW or NO probability the species occurs in this Ecological Landscape

\* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

**Figure 3-42. Vertebrate Species of Greatest Conservation Need that have both a significant association with bog relict and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of bog relict.**



### **3.3.8.2.3 Threats and Priority Conservation Actions for Bog Relict**

#### **3.3.8.2.3.1 Statewide Overview of Threats and Priority Conservation Actions for Bog Relict**

The following list of threats and priority conservation actions were identified for bog relict in Wisconsin. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Section 3.3.8.2.3.2 unless otherwise indicated.

##### Threats and Issues

- Road construction, agriculture, and development can alter hydrology to the detriment of this community type. Associated impacts from sedimentation, high nutrient loads, pollutants, and pesticides can also affect the community.
- When hydrologic changes and other impacts occur, this community may convert to shrub swamp or hardwood swamp.
- Unsustainable forest management and agricultural practices can result in soil compaction, soil erosion, water quality issues, invasive species establishment, and regeneration problems.
- More information is needed to understand how to manage this type and assess the impacts of management activities.
- Fragmentation and isolation are issues for some sites.
- Invasive plants are a major problem in some Ecological Landscapes, and should be monitored and controlled, especially glossy buckthorn.
- Tamarack is often declining, and failing to regenerate at some sites in southern regions.
- Many bog relicts in the southern Ecological Landscapes were formerly grazed, and attempts were often made to at least partially drain them to create muck farms or pasture.

##### Priority Conservation Actions

- This type requires more survey work to identify intact, high quality sites, and better document those occurrences and determine the status of associated rare species. Basic vegetation studies are still needed for conifer swamps throughout Wisconsin, to better document composition and structure, to determine the status and distributions of rare species, assess negative impacts due to hydrologic alterations and colonization by invasive plants, and to develop a classification that better reflects natural variability.
- There is a need for continued monitoring and additional research to understand the composition, disturbance regimes and dynamics needed to sustain this system.
- Southern tamarack stands should be studied to determine reasons for decline.
- Land use planning that includes consideration of conservation needs could be implemented to limit hydrologic changes that negatively affect bog relicts.
- This community type should be managed as part of a complex with other forest and wetland types where possible, or with savanna and grassland communities where appropriate. Isolated sites should be embedded in other forest habitats, or buffered from land uses that can degrade the “relict” vegetation.
- Restore altered hydrology where possible.
- Opportunities to manage for boreal birds, *Lepidoptera*, and other taxa are important and can enhance diversity at local and regional scales; additional survey work should clarify the status of some of these species and enable conservationists to better prioritize protection and management projects. WDNR's 'Peatlands Project' is expected to yield significant new information on this type (along with other peatland communities).
- Best Management Practices and other sustainable forest management practices should be used to limit soil damage, erosion, sedimentation, and hydrologic changes.
- Continue to support research to find biocontrols for invasives. Prevent the spread of new invasives into the community type.

### 3.3.8.2.3.2 Additional Considerations for Bog Relict by Ecological Landscape

Special considerations have been identified for those Ecological Landscapes where major or important opportunities for protection, restoration, and/or management of bog relict exist. Those considerations are described below and are in addition to the statewide threats and priority conservation actions for bog relict found in Section 3.3.8.2.3.1.

#### Additional Considerations for Bog Relict in Ecological Landscapes with *Major* Opportunities for Protection, Restoration, and/or Management of Bog Relict

##### *Southeast Glacial Plains*

Invasive non-native plants are a problem in southern tamarack stands (e.g., glossy buckthorn). Poison sumac can be abundant in this community, making work in this type difficult. Many tamarack stands are not regenerating and the larger trees are experiencing dieback. Fragmentation and stand isolation are significant issues in this EL.

The large forested peatlands in Jefferson County, in the Mukwonago River watershed, and at a few other locations are now classified as *southern tamarack swamp*. Past drainage to create muck farms and pasture eliminated much of the swamp conifer community here. Rare species include northern plants and animals at their southern range limits, but also some that are most often associated with southern “fen” habitats. Fire may have played an important role in maintaining this type historically. Some stands appear to be succeeding to hardwoods such as red maple. Restoration techniques need to be developed for this “type” (using the term broadly) in the southern part of its range. At some locations (e.g., Mukwonago River) it would be appropriate to manage bog relict with southern tamarack swamp, calcareous fen, southern sedge meadow, shrub-carr, oak opening, or oak woodland/southern dry forest.

#### Additional Considerations for Bog Relict in Ecological Landscapes with *Important* Opportunities for Protection, Restoration, and/or Management of Bog Relict

##### *Central Sand Hills*

Changes in hydrology due to development can be detrimental to this community type. There are continuing effects from past hydrologic changes (e.g., ditching, dike construction, road building, etc.). Some agricultural practices can result in soil erosion and water quality problems (e.g., sedimentation and high nutrient loads). Invasives are serious problems in some southern tamarack stands. Fragmentation and stand isolation affect this type in central and southern Wisconsin.

##### *Southern Lake Michigan Coastal*

Invasives are a significant problem in southern peatlands. The “northern” understory is represented by a very reduced subset of plants in this Ecological Landscape. Often, conifers are not regenerating. Stand isolation and fragmentation are major issues. High deer densities, fire suppression, and succession may all be affecting species composition and stand structure.

This type is extremely limited in acreage in this Ecological Landscape and should be embedded in other forest habitats where possible, or buffered from potentially deleterious land uses. More survey work is needed to assess the current condition of known stands. Restoration techniques should be developed for this type in southern Wisconsin.